



Billing Code 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[Docket No. 130208645-3645-01]

RIN 0648-XC209

Endangered and Threatened Wildlife; 90-Day Finding on a Petition to List 44 Species of Corals as Threatened or Endangered Under the Endangered Species Act

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.

ACTION: Notice of 90-day petition finding.

SUMMARY: We (NMFS) announce a 90-day finding on a petition to list 44 species of corals off Alaska as threatened or endangered under the Endangered Species Act (ESA). We find that the petition does not present substantial scientific or commercial information indicating that the petitioned actions may be warranted.

ADDRESSES: Copies of the petitions and related materials are available online at <http://www.alaskafisheries.noaa.gov/protectedresources/coral/default.htm> or upon request from the Assistant Regional Administrator for Protected Resources, Alaska Region, NMFS, P.O. Box 21668, Juneau, AK, 99802-1668.

FOR FURTHER INFORMATION CONTACT: John Olson, NMFS Alaska Region, (907) 271-1508; Jon Kurland, NMFS Alaska Region, (907) 586-7638; or Maggie Miller, NMFS Office of Protected Resources, (301) 427-8403.

SUPPLEMENTARY INFORMATION:

Background

On August 20, 2012, we received a petition from the Center for Biological Diversity to list 44 taxa of coral (42 species, one subspecies and one variant) as threatened or endangered under the ESA. The petition is entitled “Petition to List 43 Coral Species under the Endangered Species Act” but it provides information regarding 44 taxa. We are therefore treating the petitioned action as the listing of 44 taxa. The petitioner also requested that critical habitat be designated for these corals concurrent with listing under the ESA. The petition asserts that synergistic threats of ocean warming, ocean acidification, commercial fisheries, oil spills, and other impacts affect these species. The petition briefly summarizes the description, taxonomy, distribution, and status for each petitioned species. It also describes current and future threats that the petitioner asserts are affecting or will affect these species.

The 44 taxa included in the petition are: Arthrogorgia otsukai, Arthrogorgia utinomii, Fanellia compressa, Fanellia fraseri, Narella abyssalis, Narella alaskensis, Narella arbuscula, Narella bayeri, Narella cristata, Plumarella aleutiana, Plumarella echinata, Plumarella hapala, Plumarella nuttingi, Plumarella profunda, Plumarella robusta, Plumarella spicata, Plumarella superba, Primnoa pacifica var. willei, Primnoa wingi, Thouarella cristata, Thouarella trilineata, Alaskagorgia aleutiana, Cryogorgia koolsae, Cavernularia vansyoci, Swiftia beringi (a junior synonym for Calcigorgia beringi), Crypthelia trophostega, Cyclohelix lamellata, Errinopora dichotoma, Errinopora disticha, Errinopora fisheri, Errinopora nanneca, Errinopora undulate, Errinopora zarhyncha, Stylaster trachystomus, Stylaster ellasotomus, Stylaster brochi, Stylaster alaskanus, Stylaster leptostylus, Stylaster campylecus, Stylaster crassiseptum, Stylaster parageus, Stylaster repandus, Stylaster stejnegeri, and Distochopora borealis. Stylaster cancellatus is also mentioned in the petition but this is a junior synonym for Stylaster alaskanus.

All 44 taxa are found in waters off Alaska in the Aleutian Islands, Gulf of Alaska, and/or Bering Sea.

#### ESA Statutory and Regulatory Provisions and Evaluation Framework

Section 4(b)(3)(A) of the ESA of 1973, as amended (U.S.C. 1531 et seq.), requires that, to the maximum extent practicable, within 90 days of receipt of a petition to list a species as threatened or endangered, the Secretary of Commerce make a finding as to whether that petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted, and promptly publish such finding in the Federal Register (16 U.S.C. 1533(b)(3)(A)). When we find that substantial scientific or commercial information indicates the petitioned action may be warranted (a “positive 90-day finding”), we are required to commence a review of the status of the species concerned during which we will conduct a comprehensive review of the best available scientific and commercial information. In such cases, we are to conclude the review with a finding as to whether the petitioned action is warranted within 12 months of receipt of the petition. Because the finding at the 12-month stage is based on a more thorough review of the available information, a “may be warranted” 90-day finding does not prejudice the outcome of the status review.

Under the ESA, a listing determination may address a species, subspecies, or, for any vertebrate species, a distinct population segment (DPS) which interbreeds when mature (16 U.S.C. 1532(16)). Because corals are invertebrate species, we are limited to assessing the status of species or subspecies of corals. A species or subspecies is “endangered” if it is in danger of extinction throughout all or a significant portion of its range, and “threatened” if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (ESA sections 3(6) and 3(20), respectively, 16 U.S.C. 1532(6) and (20)). The ESA requires

us to determine whether species are threatened or endangered based upon any of the following section 4(a)(1) factors: the present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; and any other natural or manmade factors affecting the species' existence (16 U.S.C. 1533(a)(1)).

Implementing regulations issued jointly by NMFS and the US Fish and Wildlife Service (50 CFR 424.14(b)) define “substantial information” in the context of reviewing a petition to list, delist, or reclassify a species as the amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted. When evaluating whether substantial information is contained in a petition, the Secretary must consider whether the petition: (1) clearly indicates the administrative action recommended and gives the scientific and any common name of the species involved; (2) contains detailed narrative justification for the recommended measure, describing, based on available information, past and present numbers and distribution of the species involved and any threats faced by the species; (3) provides information regarding the status of the species over all or a significant portion of its range; and (4) is accompanied by the appropriate supporting documentation in the form of bibliographic references, reprints of pertinent publications, copies of reports or letters from authorities, and maps (50 CFR 424.14(b)(2)).

Court decisions clarify the appropriate scope and limitations of the Services' review of petitions at the 90-day finding stage in making a determination whether a petitioned action may be warranted. As a general matter, these decisions hold that a petition need not establish a strong likelihood or a high probability that a species is either threatened or endangered to support a positive 90-day finding.

Decisions under the ESA must be based on the best scientific and commercial data available. We evaluate the petitioner's request based upon the information in the petition including its references, and the information readily available in our files. If the petitioner's sources are based on accepted scientific principles, we will accept them and characterizations of the information presented unless we have specific information in our files that indicates the petition's information is incorrect, unreliable, obsolete, or otherwise irrelevant to the requested action. Information that is susceptible to more than one interpretation or that is contradicted by other available information will not be dismissed at the 90-day finding stage, so long as it is reliable and a reasonable person would conclude it supports the petitioner's assertions. In other words, conclusive information indicating the species may meet the ESA's requirements for listing is not required to make a positive 90-day finding. We will not conclude that a lack of specific information alone negates a positive 90-day finding, if a reasonable person would conclude that the unknown information itself suggests an extinction risk of concern for the species at issue.

To make a 90-day finding on a petition to list a species, we evaluate whether the petition presents substantial scientific or commercial information indicating the subject species may be either threatened or endangered, as defined by the ESA. First, we evaluate whether the information presented in the petition, along with the information readily available in our files, indicates that the petitioned entity constitutes a "species" eligible for listing under the ESA. Next, we evaluate whether the information indicates that the species at issue faces extinction risk that is cause for concern; this may be indicated in information expressly discussing the species' status and trends, or in information describing impacts and threats to the species. We evaluate any information on specific demographic factors pertinent to evaluating extinction risk for the

species at issue, and the potential contribution of identified demographic risks to extinction risk for the species. We then evaluate the potential links between these demographic risks and the causative impacts and threats identified in section 4(a)(1).

Information presented on impacts or threats should be specific to the species and should reasonably suggest that one or more of these factors may be operative threats that act, will act, or have acted on the species to the point that it may warrant protection under the ESA. Broad statements about generalized threats to the species, or identification of factors that could negatively impact a species, do not constitute substantial information that listing may be warranted. We look for information indicating that not only is the particular species exposed, or reasonably likely to be exposed, to a factor, but that the species may respond or may presently be responding in a negative fashion; then we assess the potential significance of that negative response.

### Biology of Coral Species

Corals are defined as “animals in the cnidarian class Anthozoa and Hydrozoa that produce either calcium carbonate (aragonite or calcite) secretions resulting in a continuous skeleton or as numerous, usually microscopic, individual sclerites, or that have a black, horn-like proteinaceous axis” (Cairns, 2007). All of the petitioned corals belong to the phylum Cnidaria and to the classes Anthozoa or Hydrozoa. The anthozoans are exclusively polypoid (i.e., generally sessile) with no medusoid (i.e., generally free-swimming) stage and include the orders Scleractinia (scleractinians) and Pennatulacea (sea whips and sea pens). The hydrozoans generally retain both the polypoid and medusoid stages in their life cycle and include the order Anthoathecatae (hydrocorals). To date, 134 unique coral taxa have been found in Alaskan waters (Stone and Rooper, in review) and all are ahermatypic (i.e., non-reef forming) and

azooxanthellate (i.e., do not contain symbiotic algae in their tissues). They have a broad distribution in Alaskan waters and are found at depths between 3 and 6,328 meters (m) (Stone and Rooper, in review).

Gorgonians are the most diverse coral group in Alaskan waters with 61 unique taxa from 7 families (Stone and Rooper, in review). They are the most important structure-forming corals in Alaskan waters and generally require exposed, hard substratum for attachment (Stone and Shotwell, 2007). Gorgonians are locally abundant, contagiously distributed, and form both single- and multi-species assemblages (Stone and Shotwell, 2007). They range in depth from 6 to 4,784 m (Stone and Shotwell, 2007). Their skeletal components are composed of aragonite, calcite, high-magnesium calcite, amorphous carbonate hydroxylapatite and there is some evidence that some taxa may have polymorphic skeletons (Cairns and MacIntyre, 1992). Of the 23 gorgonians listed in the petition, 11 taxa are known exclusively from the Aleutian Islands, 5 appear to be endemic to seamounts, 4 are known from the Aleutian Islands and Bering Sea Slope, 1 is known from the western Gulf of Alaska and Aleutian Islands, Primnoa pacifica var. willeyi ranges throughout Alaskan waters south of the Bering Sea, and Swiftia beringi (actually Calcigorgia beringi) appears to be broadly distributed from the eastern Gulf of Alaska through the Aleutian Island Archipelago (Stone et al., in preparation).

Sea whips and sea pens have a widespread distribution in Alaskan waters and are represented by 10 taxa in 3 families (Stone and Shotwell, 2007). Several are important structure forming corals and at least three species form extensive groves in soft sediment areas (Stone and Shotwell, 2007). They range in depth from 3 to 2,947 m (Stone and Shotwell, 2007) and their skeletons appear to be composed exclusively of high-magnesium calcite (Stone et al., in

preparation). The single pennatulacean listed in the petition is known from one specimen collected in the Aleutian Islands (Williams, 2005).

Hydrocorals have a widespread distribution in Alaska but have not been reported from seamounts and are extremely rare north of the Aleutian Archipelago slope (Stone et al., in preparation). They are represented by 24 taxa in Alaskan waters (R. Stone, unpublished data) and several species are important structure forming corals (Stone and Shotwell, 2007). They form erect or encrusting calcareous colonies and require exposed, hard substratum for attachment. They range in depth from 10 to 2,124 m (Stone and Rooper, in review) and their skeletons may be composed of aragonite, calcite, high-magnesium calcite, amorphous carbonate hydroxylapatite, and there is some evidence that some taxa may have polymorphic skeletons (Cairns and MacIntyre, 1992). Of the 19 hydrocorals listed in the petition, 14 are known only from the Aleutian Islands, 3 are known from the Aleutians Islands region and the eastern Gulf of Alaska, and 2 are known from the Aleutian Islands and the southern Bering Sea (Stone et al., in preparation).

#### Analysis of Petition

The petition describes factors which it asserts have led to the current status of these corals, as well as threats which it asserts the taxa currently face, categorizing them under the ESA section 4(a)(1) factors. The petition focuses on habitat threats, asserting that the habitat of the petitioned coral taxa is under threat from several processes linked to anthropogenic greenhouse gas emissions, including ocean acidification, ocean warming, and changes in currents and salinity. The petition also asserts that these global habitat threats are exacerbated by local habitat threats posed by commercial fishing activities, oil and gas exploration and production,



and oil spills. Finally, the petition contends that the existing regulatory mechanisms in place are inadequate to address the identified threats to corals.

For each of the petitioned taxa, we evaluated whether the information provided or cited in the petition met the regulatory standard for “substantial information.” We also reviewed other readily available information (i.e., currently within NMFS files) related to the distribution, abundance, and threats to the petitioned taxa.

Information submitted by the petitioner for each of the 44 coral taxa was limited to a brief taxonomic/physical description, geographic and depth distribution information based on the cited literature, a map describing the possible spatial distribution, and a relatively generic status statement. Some distribution descriptions also contained temperature or substrate data. Relatively little species-specific information was presented in the petition or is presently available on the biology, population characteristics, distribution, or status of the 44 individual taxa. The petitioner provided no species-specific information on abundance or trends. The petition states on page 27 that “[t]here are several factors that play an important role in the distribution of Alaska coral species, including nutrient flows and productivity, water temperature, availability of hard substrate, currents and sediment load, and seawater chemistry make-up including salinity and calcium carbonate saturation state.” These statements are not referenced and we are unaware of any research that has been conducted in Alaska to date to support them. The petition continues: “[t]hese factors were not included in the mapping process as they are not readily available, and the specific interactions of these factors to each species’ distribution are unknown.” The petition acknowledges limited available data regarding the distribution, range, abundance, and population trends for the petitioned taxa and relies instead on relatively generic

status statements for each of the petitioned taxa that suggest limited range (endemism) as well as a limited ability of corals to repair damage, adapt to new conditions, or colonize disturbed areas.

Of the 44 petitioned coral taxa, 22 species have been described in just the past decade (14 of those in 2011). These include five species of Narella (N. abyssalis, N. alaskensis, N. arbuscula, N. bayeri, and N. cristata) collected during submersible surveys in 2002 and 2004 and formally described in 2007 (Cairns and Baco, 2007). These are all deep bathyal species and appear to be endemic to Gulf of Alaska seamounts. New species also include two gorgonians (Alaskagorgia aleutiana and Cryogorgia koolsae) and the small, cryptic pennatulacean Cavernularia vansyoci from the Aleutian Islands (Sanchez and Cairns, 2004; Williams, 2005). The latter species is known from only a single specimen. Cairns (2011) published a major revision of the Primnoidae that yielded eight new species that are included in the petition, principally from the Aleutian Islands (Plumarella aleutiana, P. echinata, P. hapala, P. nuttingi, P. profunda, P. robusta, Thouarella cristata, T. trilineata). All of these species are extremely difficult to differentiate from each other, particularly in the field, and consequently our knowledge of their distribution is largely limited to expertly identified museum specimens. Cairns and Lindner (2011) also performed a major revision of the hydrocorals (Stylasteridae) from Alaskan waters yielding six new species that are included in the petition (Errinopora dichotoma, E. disticha, E. fisheri, E. undulata, Stylaster repandus, and S. crassiseptum). The genera Errinopora and Stylaster require advanced taxonomic expertise to identify to species in the field or laboratory and consequently our knowledge of their distribution is largely limited to expertly identified museum specimens.

The remaining gorgonians in the petition are somewhat easier to identify in the field, and of those, six (Arthrogorgia otsukai, A. utinomii, Fanellia compressa, F. fraseri, Primnoa pacifica

var. willeyi, and P. wingi) have been fairly well documented and most have been caught incidentally and repeatedly in bottom trawl surveys that NMFS conducts in the Gulf of Alaska and Bering Sea to assess groundfish stocks. Plumarella spicata and P. superba are not documented in the NMFS bottom trawl survey. Swiftia beringi (actually Calcigorgia beringi) is relatively easy to identify in the field but is relatively uncommon and seldom encountered in the NMFS bottom trawl survey. Of the remaining hydrocorals, Crypthelia trophostega, Cyclohelia lamellata, Errinopora nanneca, E. zarhyncha, Stylaster brochi, and S. campylecus are relatively easy to differentiate to species level in the field and consequently some information on their distribution is available from the NMFS bottom trawl survey. Distichopora borealis has not been documented in the NMFS bottom trawl survey. Stylaster alaskanus, S. ellasotomus, S. leptostylus, S. parageus parageus, S. stejnegeri, and S. trachystomus are very difficult to identify to species and consequently few records are available from any source for these taxa.

The petition presents little information on the past or present numbers, relative abundance, or distribution of the petitioned taxa, which is understandable because for many of the species only scant information exists. As noted above, 22 of the petitioned taxa are new to science in the last decade. For the other 22 petitioned taxa, sampling has been largely opportunistic as bycatch in surveys to assess groundfish stocks using trawl gear that is not designed to sample corals. To supplement information presented in the petition, we reviewed the 38,752 bottom trawl survey data points in our files (available at [http://www.afsc.noaa.gov/RACE/groundfish/survey\\_data/data.htm](http://www.afsc.noaa.gov/RACE/groundfish/survey_data/data.htm)) for the Aleutian Islands, Bering Sea, and Gulf of Alaska, and found 1,151 tows in which corals were caught incidentally since 1982, including 17 of the petitioned taxa. These data demonstrate a substantially wider distribution for some of these taxa than reported in the petition, both geographically and with

regard to depth. We also have information that one of the species listed in the petition as “endemic to the Aleutian Islands, Gulf of Alaska, and Bering Sea,” Swiftia beringi, has confirmed occurrences off Washington State. Nevertheless, systematic surveys have not been conducted in Alaska to assess the distribution, abundance, or population trends of these (or other) corals, providing no reliable basis to assess their status. Trawl surveys off Alaska are limited to areas that are relatively flat and not too rough, yet many Alaskan coral species, particularly in the Aleutian Islands, prefer hard substrate with high currents and steep slopes (Woodby et al., 2009) that are not conducive to sampling with a bottom trawl. NMFS and others have conducted coral research in Alaska with other tools (e.g., submersibles) that has confirmed a much broader depth and geographical distribution and more varied habitat for many Alaskan coral species than previously documented (Stone, 2006; Stone and Alcorn, 2007; Miller et al., 2012). Even these efforts provide an incomplete picture of the population-level status and abundance of these species. Based on our review of the petition and other information available to us, too little survey information exists to conclude that the small number of documented occurrences of the petitioned taxa may equate to a risk of extinction due to low population size. We expect, based on surveys conducted to date, that additional survey effort would result in additional observations of the petitioned taxa in other locations.

We examined each of the threats listed in the petition. Ocean acidification due to anthropogenic carbon dioxide emissions and oceanographic changes resulting from climate change are described in the petition as major threats. NMFS scientists are aware that others have hypothesized that both may produce conditions that directly and indirectly affect cold water corals, yet no empirical studies to date have demonstrated deleterious effects to the petitioned taxa or to similar coral taxa. The petition draws entirely on the results of ocean acidification

research conducted on tropical corals and a single cold water coral species (Lophelia pertusa). Tropical scleractinian corals and cold water corals are very different animals both physiologically and ecologically. Tropical scleractinian corals are typically hermatypic (reef-building), contain intracellular zooxanthellae (symbiotic photosynthetic dinoflagellates), and inhabit shallow warm waters. L. pertusa is a reef building scleractinian predominantly found in the North Atlantic Ocean and is not found in the northern North Pacific Ocean. It is the only cold water coral for which there is species-specific information on the physiological effects of lowered pH (Maier, 2009). The results of that study were contradictory; L. pertusa exhibited reduced growth when exposed to lower pH but colonies still showed positive net calcification. Ocean acidification literature generally would lead scientists to expect both reduced growth and negative net calcification, so we find the Maier (2009) study unhelpful for assessing whether the petitioned corals may react negatively to ocean acidification.

The petitioned corals and scleractinian corals (such as the tropical corals and L. pertusa) are not closely related and we find no basis to expect that they would have similar physiological responses to stress. Scleractinians and hydrocorals are related at the Phylum level whereas scleractinians and octocorals (gorgonians and pennatulaceans) are related at the Class level. Most importantly, the biomineralization processes for scleractinians and the petitioned coral groups are entirely different, so it is not appropriate to use the responses of the first group of corals as a surrogate for the latter group. Scleractinians accrete aragonite whereas all gorgonians and many hydrocorals accrete calcite and/or high-magnesium calcite. The biomineralization mechanisms that produce these compounds are very different (Lowenstam and Weiner, 1989). Aragonite is the kinetically favored polymorph of calcium carbonate to precipitate from seawater and scleractinian aragonite crystals are morphologically and chemically similar to aragonites

precipitated inorganically (Holcomb et al., 2009). Two factors indicate that scleractinian calcification is more of an inorganic process compared to gorgonians and hydrocorals (including the petitioned taxa) where the organic matrix plays a much more prominent role in calcification. First, scleractinian mineralization is entirely extracellular whereas gorgonian spicules are formed intracellularly. Second, the percent organic matrix in scleractinian coral skeletons is very small (< 1 percent) compared to a very high percentage for gorgonians and hydrocorals (Cohen and Holcomb, 2009).

The literature cited in the petition does not support the petitioned action. For example, the petition states that undersaturation of calcite will affect the growth and repair of both the corals and the plankton that provide the corals' food and nutrient sources and then cites the work by Comeau et al. (2010) on pteropods. Drawing inferences based upon effects on pteropods is inappropriate because pteropods are not corals (they are mollusks), belong to an entirely different phylum of animals, and unlike corals are generally free-swimming and pelagic. Similarly, the petition states that shifting currents as the result of climate change may limit nutrients available to the petitioned species. The petition presents no evidence that currents in the areas of the petitioned corals may shift, and no scientific information is available regarding the role water currents play in delivering nutrients to the petitioned taxa. Rather, the petition provides citations from the tropical coral literature (Coma et al., 2009; Donner, 2009) that are not applicable to cold water corals. The petition states that global climate change and ocean acidification will impair biological and ecological functions of cold water corals, degrade habitat, and actively erode existing coral colonies, yet cites the work by Orr et al. (2005) on pteropods and the review by Hoffman et al. (2010) which does not provide any direct evidence to support the statement. The Hoffman paper reviews ocean acidification literature for "the responses of key marine calcifiers

at the organismal level and extend[s] these observations, where possible, to potential outcomes at the ecosystem level.” The review does not provide new information on the petitioned corals, but does state that “some deep-living corals may resist dissolution because tissues protect their carbonate skeletons.”

The petition also states that “the petitioned coral species are under severe, pervasive and growing threats from . . . ocean acidification and climate change” and again cites Hofmann et al. (2010). Hofmann et al. (2010), however, does not mention any of the petitioned corals but rather only specifically discusses the colonial scleractinian, L. pertusa, from the North Atlantic Ocean. As noted above, L. pertusa is a very different species from the petitioned taxa and we find no basis to infer that the petitioned corals would respond similarly to ocean acidification or climate change. To the contrary, extensive observations made in situ during the last decade indicate that corals in Alaska (including many of the petitioned species) are thriving at depths well below the saturation horizons in the Aleutian Islands (Stone, 2006; Heifetz et al., 2007). Additionally, all stylasterids and octocorals (including all of the petitioned taxa) have external tissue that would insulate the skeleton from acidic water, so they may not be as susceptible to the effects of corrosive seawater as other organisms that lack this tissue coverage (Rudolfo-Metalpa, 2011). In summary, while corals in other parts of the world have come under pressure, including from the effects of climate change and ocean acidification, the little information that exists regarding the petitioned cold water corals is too insubstantial to indicate that they may be threatened by the effects of climate change and ocean acidification.

The information presented in the petition on threats from commercial fishing describes how fishing gear could affect corals, but it understates the degree of conservation provided by the suite of management measures taken since 2005 to protect corals and other sensitive sea floor

habitats in Alaska, which greatly alleviate these threats. On June 28, 2006, NMFS finalized regulations to minimize the effects of fishing on Essential Fish Habitat, including substantial new measures to address concerns about the impacts of bottom trawling on benthic habitat (particularly on coral communities) in the Aleutian Islands and Gulf of Alaska (71 FR 36694). The regulations established the Aleutian Islands Habitat Conservation Area (AIHCA) to prohibit all bottom trawling in the Aleutians outside the historical footprint of the fishery. Over 95 percent of the management area (277,100 square nautical miles (nm<sup>2</sup>)) and 60 percent of “fishable depths” are closed to bottom trawling. Additionally, the regulations established six Aleutian Islands Coral Habitat Protection Areas totaling 110 nm<sup>2</sup> with especially high density coral and sponge habitat that were closed to all bottom-contact fishing gear (nonpelagic trawl, dredge, dinglebar, pot, and hook-and-line). The regulations also identified 16 seamounts (mostly

in the Gulf of Alaska) as Habitat Protection Areas and similarly closed them to all bottom contact fishing to protect corals and other habitat features. The same regulations closed 10 Gulf of Alaska Slope Habitat Conservation Areas totaling 2,086 nm<sup>2</sup> to bottom trawling and closed 5 Gulf of Alaska Coral Habitat Protection Areas totaling 13.5 nm<sup>2</sup> to all bottom contact fishing. Other substantial closures in the Aleutian Islands, such as the Steller Sea Lion protection measures, further limit the areas open to bottom trawling and therefore protect coral habitat. Preliminary GIS analysis of the NMFS trawl survey data show that in the Aleutian Islands, 30 percent of coral records are located in the AICHA alone, which is closed to bottom trawling. NMFS has also conducted cooperative research with the fishing industry, resulting in gear



modifications to trawl sweeps that have been shown to reduce the effects of non-pelagic trawls on benthic invertebrates in the Bering Sea and Gulf of Alaska.

The petition suggests that corals in the Bering Sea canyons remain unprotected from the effects of fishing and asserts that such corals are therefore vulnerable. In 2006 and 2007, the North Pacific Fishery Management Council considered protection measures for submarine canyons but ultimately postponed taking action because scientific information was not available to establish the dependence of managed fish species on habitat features of the canyons. A 2007 expedition to Zhemchug and Pribilof Canyons led to publication of a paper with new information (Miller et al., 2012). In April 2012 the Council requested that NMFS review and summarize existing and new information on the canyons, their habitat, and fish associations in those areas to assist the Council in determining whether any potential future management actions are warranted. The analysis will include the coral species in the canyons, but there is no indication at this time that corals, including the few petitioned species that are found there, face risks from commercial fishing that may warrant listing the species as threatened or endangered.

With regard to increased shipping and tourism traffic and oil spills that may accompany such increases, the petition asserts that the risk of spills will intensify over time. According to the petition, most traffic to the Bering Sea and Arctic transits Unimak Pass, thereby placing corals in the Aleutian Islands, Bering Sea, and Gulf of Alaska at risk. NOAA has developed the General NOAA Oil Model Environment (GNOME) model to predict the trajectory and weathering of oil spills. Winds, currents, tides, and climatology can all be used as inputs. However, this is a surface trajectory model and a vertical mixing component is not available. Data on currents in the Aleutian Islands are general at best, and the petition's assertion that the "currents would therefore be likely to transport oily water to cold water coral sites" is unsupported, as there is no

research to suggest a mechanism for “likely” transport of oil. Deep water flowing north in the Pacific Ocean encounters the Aleutian Trench where it is forced up onto the Aleutian Trench and into the Bering Sea through the many island passes (Johnson, 2003). Woodby et al. (2009) attempted to include currents in modeling coral distribution in the Aleutian Islands, but stated “reliable and high resolution current data were not available for model development due to the general lack of current observations in the central Aleutian Islands.” This statement is true throughout the Aleutians Islands and Alaska. Suchanek (1993) analyzed spill responses in tidal and subtidal environments and included hermatypic corals; however, mechanisms for transport of oil components to depths typical of the petitioned species in Alaska are not discussed. Information presented in the petition related to the Deepwater Horizon oil spill in the Gulf of Mexico and the effects of oil on Gulf of Mexico deep water corals is not directly relevant in Alaska as the Deepwater Horizon spill occurred at a depth of 1,259 m in an environment vastly different than the Aleutian Islands or other Alaskan waters. Fewer than a dozen exploratory wells have been drilled (and subsequently abandoned) in deep ( > 100 m) central Bering Sea waters, and there has been no exploratory activity in the Aleutian Islands. No wells have been developed for production and no platforms exist. There is a moratorium on exploration in Bristol Bay until at least 2017. In the Arctic, several wells exist; however, most are developed through human-made drilling islands in shallow water ( < 15 m). Exploration in the Chukchi Sea in 2012 was conducted in 50 m of water.

The petition cites recent discoveries of corals in the Chukchi Sea as examples of corals at risk from oil exploration and development. However, the species encountered in that instance was a soft coral, Gersemia rubiformis, which is not included in the petition. The petition states that “the density and coverage of cold water corals at the drill site were similar to those observed

in tropical coral reefs,” citing a Washington Post newspaper article (Eilperin, 2012), yet the cited article presents no such conclusion. Based on information in our files, the petitioned coral species do not occur north of approximately the Pribilof Islands in the Bering Sea, approximately 600 miles (966 km) south of the site of proposed oil exploration drilling in the Chukchi Sea. The petition does not present substantial information on possible threats from oil exploration or development to the petitioned species in Alaska.

Beginning in 2012, NMFS implemented a 3 year field research program in Alaska as part of NOAA’s Deep Sea Coral Research and Technology Program, which may help to answer some of the unknown questions with regard to corals in Alaska. The goals of the program are to better understand the location, distribution, ecosystem role, and status of deep-sea coral and sponge habitats. Research priorities include determining the distribution, abundance and diversity of deep-sea corals and sponges (and their distribution relative to fishing activity); compiling and interpreting habitat and substrate maps; determining associations of commercially important fish species (especially juveniles) with deep-sea coral and sponge habitats and the contribution of those habitats to fisheries production; determining the impacts of fishing gears and testing gear modifications to reduce any impacts; determining recovery rates of deep-sea coral and sponge communities from physical disturbance; and establishing a long-term monitoring program to determine the potential effects of climate change and ocean acidification on deep-sea coral and sponge ecosystems. Additionally, NOAA’s Ocean Acidification Program is currently analyzing the carbonate mineralogy of Alaskan corals. The mineralogy data will be used in conjunction with species distribution data (depth and geographical) and the present and projected aragonite and calcite saturation horizons in Alaska to predict the effects of ocean acidification on coral resources of the North Pacific Ocean.

## Petition Finding

We have reviewed the petition, the literature cited in the petition, and other literature and information available in our files. We find that the petition does not present substantial information indicating that the requested listing actions may be warranted for any of the 44 petitioned species.

Per 50 CFR 424.14(b)(2)(1), the petition clearly requests that NMFS list 44 taxa of corals as threatened or endangered under the ESA and provides the scientific names for each taxon. Per 50 CFR 424.14(b)(2)(2), the petition provides a narrative justification for listing but does not present information on the past or present numbers or relative abundance of the petitioned taxa and provides scant information on their distribution. Based on information from the NMFS trawl surveys, the published literature, and museum records, at least 17 of the petitioned taxa have a broader depth and geographical distribution than reported in the petition. Of the 44 petitioned taxa, 22 are new to science in the past decade and have very few recorded observations, and the remaining 22 have been recorded opportunistically as bycatch in fish surveys that are not designed to sample corals. Systematic surveys have not been conducted to assess the distribution, abundance, or population trends for any of the petitioned corals, providing no basis to assess their status. We conclude that too little survey data exist to lead a reasonable person to conclude that the small number of documented occurrences of the petitioned taxa may equate to a risk of extinction due to low population size, either now or in the foreseeable future.

Per 50 CFR 424.14(b)(2)(3), the petition provides little information regarding the status of the species. We have somewhat more information including observations from bycatch in NMFS trawl surveys, but systematic surveys for these corals have not been undertaken. At least 17 of the petitioned taxa have a wider distribution than is reflected in the petition. The threats

cited in the petition are ocean warming, ocean acidification, commercial fisheries, oil spills, and oil and gas exploration and development. Information presented in the petition regarding the effects of climate change and ocean acidification on the petitioned taxa is too tenuous or unsupported. Also, information in our files and the published literature (discussed above) suggests that certain corals off Alaska might be more resilient to the effects of ocean acidification than the petition implies, leading us to conclude that there is not substantial information that would lead a reasonable person to believe that the petitioned corals may be threatened with extinction due to the effects of climate change and ocean acidification, either now or in the foreseeable future. Regarding commercial fisheries, the petition discusses general threats from trawling and other bottom contact fishing but fails to provide a complete description of the protective measures that NMFS has implemented, particularly since 2006, to protect extensive areas of sea floor habitat off Alaska; many of the measures were expressly designed to protect corals. While some of the petitioned taxa may well exist in areas that remain open to bottom-contact fishing, due to the extensive fishery restrictions in place to protect coral habitats and the reasonable inference that the petitioned taxa likely have a wider distribution than has yet been documented in the limited surveys conducted to date, we find insufficient information to lead a reasonable person to believe that such fishing threatens those corals with extinction, either now or in the foreseeable future. Regarding oil spills and oil exploration and development, the petition discusses increasing human activity that may result in an increased risk of spills, but does not present substantial information suggesting that the petitioned corals will face exposure to spilled oil that would present a risk of extinction.

Per 50 CFR 424.14(b)(2)(4), the petition includes references and maps, although as noted above, we conclude that overall the petition does not provide substantial information to support

its conclusions, and the maps do not accurately reflect the known distribution of the petitioned taxa (acknowledging that even the known distribution is likely not the complete distribution, since comprehensive surveys have not been undertaken).

#### References Cited

A complete list of all references is available upon request from the NMFS office in Juneau, Alaska (see ADDRESSES).

#### Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

Dated: February 8, 2013.

---

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, performing the functions and duties of the Assistant Administrator for Fisheries,  
National Marine Fisheries Service.